

has not entered it. There appears a strong suspicion of variability in this case. The star's position for 1877 is in R.A. 7h. 8m. 11s., N.P.D.,  $112^{\circ} 27' 8''$ . (2) Harding has a star 6 m., a little south—preceding 40 Leonis Minoris, where in February last Mr. Gore found only a star of about 10m. The position for 1800, reading off from the Atlas, was in about R.A.  $157^{\circ} 14'$ , N.P.D.,  $63^{\circ} 28'$ . There is no star here in Lalande or Bessel, nor in the *Durchmusterung*. (3) About  $1^{\circ} 20'$  south—following the 5 m. star 6 Canis Minoris, Harding has a 6 m. which on February 4 was only  $7\frac{1}{2}$  m., being less than Lalande 14720, but brighter than 14726; it was also less than the 7 m., about  $30'$  north-preceding, which is underlined in the Atlas. This star appears to have been observed as an 8 m. by Bessel (Weisse, VII., 780), and is called 8.1 m. in the *Durchmusterung*; Harding's place, however, requires a small correction in R.A. if Bessel's star is the one entered on his map.

BIELA'S COMET IN 1805.—Of the six observed returns of this comet that of 1805 was by far the most favourable for observation, and it approached very near to the earth as it sank below the horizon in Europe. At the beginning of December it exhibited a well-defined planetary disc, according to Huth, surrounded by nebulosity  $20'$  in diameter; on the 8th Olbers found it very distinct to the naked eye, and it remained visible without the telescope after the moon had risen, though at a south declination of  $23^{\circ}$ ; the small well-defined nucleus which he had remarked in common with other observers he considered to be from twenty to thirty German miles in diameter. The comet was not observable in Europe after December 9, when it had reached  $35\frac{1}{2}^{\circ}$  S., but its after-course was a very favourable one for observation in the southern hemisphere, and, as Gauss remarked at the time, if observations from thence could have been obtained, it would have been practicable to determine at this appearance the true form of the comet's orbit, which, as is well known, greatly exercised the calculators of that day, and particularly Gauss and Bessel. The comet's apparent track in the southern heavens during the week subsequent to the cessation of observations in Europe was as follows, according to a computation from the definitive orbit in 1805, given by the late Prof. Hubbard:—

oh. G.M.T.	R.A.	N.P.D.	Distance from earth.
Dec. 9	350 9	122 26	0.03681
10	344 49	134 38	0.03698
11	337 14	145 49	0.03893
12	326 3	154 53	0.04245
14	288 36	164 36	0.05276
16	250 5	164 23	0.06570

While referring to Biela's comet, it may be noted that if the period of revolution had been so lengthened in 1872, as to delay the perihelion passage until December 27, and thus bring the comet, or what remains of it, into close proximity to the earth on the night of the great meteoric display a month previous, its return in 1879 will take place under nearly the same circumstances as in 1832, when this body was the object of so much interest.

#### NOTES

WE understand that the Fullerian Professorship of Chemistry in the Royal Institution is likely soon to be vacant by the resignation of Dr. Gladstone.

THE Council of the Yorkshire College of Science, Leeds, have arranged to purchase for £13,000, the Beech Grove Hall Estate, comprising about three and a half acres, and situated a mile from the railway stations, and close to the Grammar School. The total donations to the College have now reached £42,456.

It has been decided that of the statues of the two Humboldts which are to be erected in Berlin, that of Alexander will be given to Reinhold Begas to execute, and that of Wilhelm to M. P. Otto.

EVERY Thursday evening M. Leverrier receives at the Paris Observatory the provincial mayors who happen to be in Paris and explains to them the principles used by the International service for telegraphing its warnings all over France.

THE dreaded *Hemileia vastatrix* which has hitherto been confined to the coffee plantations of Ceylon and Southern India has at last made its appearance in Sumatra, and in all probability will find its way before long to the neighbouring islands where coffee is grown.

THE Settle Cave Exploration Committee have issued a circular asking further contributions to enable them to carry on their important work. The valuable contributions already made, both to the historical and prehistoric ethnology of Britain are already well known, but there is good reason to believe discoveries even more interesting than any yet described remain to be made. The Committee are now working in beds of still earlier age than those hitherto explored, and hope by perseverance to throw some light upon the condition of Britain and its inhabitants during some of the most obscure ages of its geological history, the interest and value of the explorations increasing as the work is carried down into lower and earlier beds. Except at the entrance, the rocky floor of the cavern has not yet been found, and it is impossible to say what treasures to science and aids to the unwritten history of man still lie beneath the feet of the explorers. Though liberally assisted by a grant from the British Association, the Committee find themselves obliged to appeal to the public for further funds, without which this interesting work will speedily come to a premature end. We are sure that the wants of the Committee only require to be made known in order to be supplied. The sum required is, after all, very moderate, and we hope that many who read this will send what they can afford to the Hon. Treasurer, Mr. John Birkbeck, jun., Craven Bank, Settle, Yorkshire.

THE present French University will probably be divided into seven or eight local universities—Paris, Nancy, Lyons, Bordeaux, Lille, Marseilles, Montpellier or Toulouse. The competition between the two last has been so sharp that it has been suggested to divide between them the boon sought for. None of the existing Faculties in a large number of provincial towns will be suppressed, but will become affiliated to the nearest university. Each university will be governed by a special Senate or Council, and the Minister of Public Instruction will have authority over all of them. Fellowships will be created by the government, and will be distributed according to merit, after due examination.

ALL who have read Mr. Smiles's "Scottish Naturalist" must remember the crowning incident of Mr. Edward's exhibition of his collection in Aberdeen, when, in his despair at the total unsuccess of his venture, he rushed to drown his misery in the Dee. Mr. Edward was the chief actor in a very different scene in the same city on Wednesday week, when the proverbially hard-headed and close-fisted citizens of Bon Accord tried to make amends for their former almost fatal neglect, by presenting him publicly, through their Lord Provost, with an olive-wood casket containing 333 sovereigns. Mr. Edward, who seems to be taking his sudden eminence very quietly, thanked the subscribers in a short speech spoken in broad Doric and characterised by perfect naturalness and much humour—Scotch, perhaps, but not Highland, as some of the papers characterise it, for Aberdeen and Banff are as much "Highland" as Berwick and Newcastle. Mr. Edward made no allusion to his former treatment by the certainly not obtuse Aberdonians, who, after all, can't be blamed for not making it their business to discover and succour genius, though the gift of the "bit boxie," as Edward called it, looks very like as if meant to be a peace-offering.

THE papers read at the Iron and Steel Institute last week were all of a purely technical nature. The Bessemer Medal was

presented by the President to Dr. Percy, who, in his reply, hinted that he is at present engaged in a large new metallurgical work. The Institute unanimously approved of the President's proposal to endeavour to obtain for the applied science societies a common permanent home. The Institute holds its autumnal meeting in Newcastle in September next, Norway having been abandoned, mainly, we believe, on account of the death of the Foreign Secretary, Mr. David Forbes. The Institute of Naval Architects, which also met last week in London, intends, we believe, to have for the first time an autumnal session, Glasgow and the Clyde having been selected for a visit next August.

THE following are the probable arrangements after Easter at the Royal Institution for the Friday evenings:—April 13, Dr. William Spottiswoode, Treas. R.S., Experiments with a Great Induction Coil; April 20, Mr. Frederick Pollock, M.A., Spinoza; April 27, Lieut.-Gen. Richard Strachey, R.E., F.R.S., The Physical Causes of Indian Famines; May 4, Rev. W. H. Dallinger, Researches on the Origin and Development of Minute and Low Forms of Life; May 11, Mr. D. Mackenzie Wallace, M.A., The Intellectual Movements and Secret Societies in Russia; May 18 [blank]; May 25, Mr. G. J. Romanes, The Evolution of Nerves and Nervo-Systems; June 1, Mr. Oscar Browning, The History of Education; June 8, Prof. Tyndall, F.R.S. The lecture arrangements are as follows:—Prof. J. H. Gladstone, F.R.S., Five Lectures on the Chemistry of the Heavenly Bodies, on Tuesdays, April 10 to May 15; Prof. Tyndall, F.R.S., Eight Lectures on Heat, on Thursdays, April 12 to May 31; Mr. Edward Danreuther, Two Lectures on Chopin and Liszt, on Saturday, April 14, and Thursday, June 7; The Rev. A. H. Sayce, M.A., Three Lectures on Babylonian Literature, on Saturdays, April 21, 28, and May 5; Mr. Walter H. Pollock, M.A., Three Lectures on Modern French Poetry, on Saturdays, May 12, 19, 26; Mr. Charles T. Newton, C.B., Two Lectures on the Recent Discoveries at Mycenæ, on Saturdays, June 2 and 9.

THE first of the letters from Mr. Stanley, already referred to, is published in Monday's *Daily Telegraph*. It is dated Ujiji, August 7, 1876. Mr. Stanley has succeeded in circumnavigating Lake Tanganyika, exploring every indentation, and has made a material addition to our knowledge of this interesting body of water. As might have been expected, he has occasion to supplement and correct the observations of his predecessors. On the mistakes of the latter he dwells at quite unnecessary length, and discusses them in an aggravatingly apologetic tone, which becomes quite irritating, and does not in the least enhance the value of his own discoveries, which require no contrast to bring out their importance. The greater part of Mr. Stanley's letter is occupied with an account of his exploration of the Lukuga, Cameron's supposed outlet of the lake, but which Mr. Stanley maintains, on what appear solid grounds, to be merely a creek, the surface current of which is influenced by the wind. The most extraordinary result, however, of his examination of the lake and of the Lukuga, is that the former is rising with comparative rapidity—several feet since Cameron's visit—and that in the course of a very few years the Lukuga will develop into an effluent river, which will pass over the narrow mud-swamp that separates it from the river Luindi, flowing westwards to the Kamolondo River (it is not a lake), and thence to the Lualaba. Thus, what Cameron discovered, is not the present, but the future outlet of the Tanganyika, which hitherto Mr. Stanley maintains, has had no outlet. It must not be forgotten that this outlet has already been suggested by Livingstone; writing on October 8, 1871, about three years before Cameron's visit, he says, "It may be that the Loingumba is the outlet of Tanganyika; it becomes the Luasse further down, and then the Luanio before it joins the Lualaba; the country slopes that way, but I was too ill to examine its source." The interest of geologists will cer-

tainly be excited, if not satisfied, by some references in Mr. Stanley's letter. He speaks of basalt and trap-rocks as occurring in the district, and of a large portion of the shores of the lake being composed of calcareous tufa; he also, somewhat more obscurely, refers to what he thinks may be volcanic cones; and states that considerable quantities of asphalt have been found floating on the waters of the lake. The theory which Mr. Stanley suggests as explaining the origin of this vast lake is of a sufficiently startling character. At no remote period, his hypothesis is, this part of Africa was a level table-land, westwards across which flowed the Malagarazi, and other rivers along a channel which is now occupied by the Lukuga and Luindi. But a great volcanic convulsion disturbed the region, sinking a deep hollow across the channel of the Malagarazi, which, with other streams, has ever since been filling up the bed. Mr. Stanley supposes he has come upon the lake when it has almost reached its highest level and is about to form an outlet by the Lukuga. Until more detailed and exact information reaches us concerning the structure of the country it would be premature to enter upon a discussion of this theory. Possibly Mr. Stanley's other letter, which will be published to-day, may enable geologists more fully to understand the conclusions at which the traveller appears to have arrived. In the north-west part of the lake, what Burton, Speke, and Stanley himself had thought to be an island, Ubwari, is really a peninsula. This is so indicated on Livingstone's map, with the remark that "a sandy spit connects Mozima Island and the shore."

ON Monday night Sir George Nares read a paper on some of the results and observations of the late Arctic Expedition. He discussed mainly the state of the ice and the limits of life in the most northern channels, and concluded by stating his conviction that unless the coast of Greenland extended beyond lat.  $83^{\circ} 20'$ , the Pole would not be accessible by the Smith Sound route. In the discussion which followed it was evident that a marked change of opinion has followed the results of the late expedition as to the best route to the Pole, the general opinion being that the Smith Sound route must be abandoned and that by Spitzbergen tried. This must no doubt be gratifying to Dr. Petermann, who has so long advocated the latter route, though this change of opinion is not at all inconsistent with the idea that much valuable scientific information is still to be obtained in the Smith Sound region. Admiral Richards expressed his decided conviction that sledge travelling is at an end, although he does not venture on the opinion that ships would actually reach the Pole by the Spitzbergen route. Now that the Presidential excitement is over in America, we may hope to hear of preparations being made for the establishment of the proposed Polar Exploring Colony.

THE National French Committee for the Exploration and Civilisation of Southern Africa has held its inaugural meeting. M. De Lesseps was appointed president. Two delegates were appointed to represent the French Section in the large Committee presided over by the King of the Belgians. They are MM. D'Abbadie, Member of the Institute, and Grandidier, the French explorer of Madagascar.

A SECOND Italian expedition for the exploration of Africa, has arrived at Suez.

THE *Honolulu Gazette* of February 28, reports an extraordinary volcanic outbreak in Kealakeakana Bay, near the entrance to the harbour. The eruption occurred at 3 A.M. on the 24th, appearing like numerous red, green, and blue lights. In the afternoon the water was in a state of peculiar activity, boiling and broken, and heaving up blocks of red-hot lava. A severe shock of an earthquake was felt by the residents of Kannakakiel during the night of the eruption.

MR. STANFORD has just published five more physical wall-maps of the series noticed by us some time since. One chief feature of these maps is their exhibition of the orography of the respective countries, and we still think it would be an improvement if the green could be dispensed with, as by gas-light it and the blue of the water are indistinguishable. We are glad to know, however, that means are being taken to remedy this in future issues, which we think may easily be done by the use of various shades of brown; when this is done the maps will leave little to be desired. They are those of North and South America, Africa, Scotland, and Ireland. Each map is up to the latest date, and as physical maps, showing at the same time all the main natural and artificial features of the various countries, they must be quite a luxury to teachers and students, and to all who have to consult maps. Africa especially is thoroughly satisfactory, and the compiler has wisely abstained from following any theory as to the course of the fragmental rivers west of Tanganyika, unless indeed one may be led to infer that he believes Lake Chad to be the receptacle of much of the drainage attributed to the Congo and the Ogové; if so, his theory, judging from the little that is known of the rivers themselves, and the various elevations of the region so clearly shown in the map, is quite as probable as any other.

M. LEVERRIER recently received a requisition from the Chamber of Commerce of Marseilles for the establishment of a special service for the Mediterranean coasts. M. Leverrier replied that the military government had established in Algeria a special meteorological service which pertinaciously refused to comply with the rules of the international service. Consequently it was impossible for him to take advantage of Algerian observations so long as the special rules of the Algerian Meteorological Service were not altered, and without Algeria no reliable service could be established at Marseilles.

THE opening meeting for 1877 of the West Riding Consolidated Naturalists' Society will be held at Pontefract on Easter Monday, April 2.

WE have to record the death, on the 9th inst., of Dr. John Scott Bowerbank, F.R.S., so well known from his important investigations on sponges. Dr. Bowerbank, born in 1797, in London, commenced life as a distiller, but being attracted by biological studies, subsequently devoted himself to them. In 1833 his first paper appeared in the *Entomological Magazine*, on the circulation of the blood in insects, from which time numerous papers by him have appeared in the *Philosophical Magazine*, the *Microscopical Journal*, the *Annals of Natural History*, the *Philosophical Transactions* and the *Proceedings* of the Zoological Society, upon the geological and structural relations of the Spongidae, upon Pterodactyles, upon the structure of the shells of the Mollusca, and other less important points. Dr. Bowerbank was a Fellow of many learned societies, with the foundation of more than one of which he was intimately associated, including the Microscopical, the Ray, and the Palaeontological.

THE tomb of Crocé-Spinelli and Sivel, the two *Zenith* aéronauts, will be inaugurated at Père la Chaise on April 4.

THE Annual Congress of the *Sociétés Savantes* will, as usual, take place at Paris on April 3 and following days.

A WELL-ATTENDED soirée was given by the Northampton Naturalists' Society on Tuesday evening, March 6, in the Science and Art Rooms of the Grammar School. A large and valuable series of natural objects were displayed, many of which had been collected during the past year. Amongst those especially worthy of note were a splendid collection of eggs, exhibited by the Rev. G. Nicholson; of butterflies, A. Perry, Esq.; of plants, by G. C. Druce, Esq.; and

of fossils, by W. Hull, Esq., and C. Jecks, Esq. The opening address was given by the Rev. R. Winterbotham, and short addresses were delivered in the course of the evening, by the Very Rev. Canon Scott, the Rev. W. F. Aveling, and B. Thompson, Esq. A beautiful collection of photographs was exhibited by R. G. Scriven, Esq., and H. Manfield, Esq., under the superintendence of the Rev. S. J. W. Sanders, and the attractions of the evening were still further enhanced by the exhibition of several excellent microscopes, and other scientific instruments, kindly lent by various gentlemen of the town and neighbourhood.

IN "The Stone Age in New Jersey," by Dr. C. C. Abbott (Washington, Government Printing Office), a valuable mass of facts on the various implements and weapons found in that state is collected and discussed, and illustrated by upwards of 220 cuts.

PART 4 of vol. i. of the *Proceedings* of the West London Scientific Association contains, among other interesting papers, one on Waves, by Prof. F. Guthrie, F.R.S.

AMONG other matters that came before the German Ornithological Society at a recent meeting, mention was made by M. Mützel of an osprey which had lived eighty years in captivity on a farm near Neu Damm. M. Schalow took up the question whether in bad weather birds stop their migratory flight and return, or not. He affirmed that they either went on or remained for a time where they happened to be caught by the weather. M. von Schleinitz, of the *Gazelle*, stated that several individuals of *Chionis minor* had been brought from Kerguelen's Land to St. Paul's. It remains to be seen on later visits to St. Paul's whether the birds will still be found there.

M. DECHARME has been studying the comparative pitch of sounds given by various metals and alloys. Cylindrical bars of each metal were used, all of the same length and diameter (20 cm., and 1 cm.). The metals examined rank as follows in ascending series:—Lead ( $fa_3$ , 690 vibrations), gold, antimony and silver (the same), tin, brass, zinc, copper, cast-iron, iron, steel, aluminium ( $fa_5$ , 2,762 vibrations). From lead to aluminium there is thus an interval of two octaves. No simple relations, sufficiently exact, were perceived between the pitch of the sounds and the physical or chemical properties of the substances. M. Decharme's results differ considerably from those of Wertheim.

THE circumference (not the diameter) of the exploring balloons for meteorological purposes in Paris, referred to last week, is ninety centimetres. They have an ascensional force of about thirty grammes.

PROF. GARROD illustrated his Royal Institution lectures by a colossal model of a disarticulated human skull, not skeleton, as we stated last week.

THE additions to the Zoological Society's Gardens during the past week include a Puma (*Felis concolor*) from South America, presented by Commander Stanhope Grove, R.N.; a Nisnas Monkey (*Cercopithecus pyrrhonotus*) from Nubia, presented by Mr. B. C. Simpson; a Burrhel Wild Sheep (*Ovis burrhel*) from the Himalayas, deposited; two Hairy Tree Porcupines (*Sphingurus villosus*), two White-fronted Guans (*Penelope jacucaca*) from Brasil, two Blue-bearded Jays (*Cyanocorax cyanopogon*) from Para, two Turkey Vultures (*Cathartes aura*) from America, two Upland Geese (*Bernicia magellanica*) from Patagonia, three West Indian Rails (*Aramides cayennensis*), a Common Boa (*Boa constrictor*) from South America, two Great Cyclodus Lizards (*Cyclodus gigas*), a Stump-tailed Lizard (*Trachydosaurus unguis*) from Australia, purchased; a Zebu (*Bos indicus*) born in the Gardens.